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**Achieving Navigation Systems
Acceptable Levels of Risk**

# Performance Assessments & Standards Great Lakes & Ohio River Navigation Systems

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# Topics

- Five Year Development Perspective
- Performance Standards
- Performance Assessments
- Key Emphasis Points

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# – Cohesive Strategy – Five Year Development Perspective

## Provide cohesive Navigation System development needs

- Presents cohesive $2.8 billion ORS & $0.9 billion GL optimum needs gelling the individual projects into system perspective

## Concisely describe system development rationale

- Summarizes construction development sequence, maintenance, investigations
- **Exhibited Performance Standards & Assessments to summarize conditions**

## Reflect optimum system funding needs

- Emphasizes risk & reliability as technical foundation for investments

## Facilitate stakeholders involvement & participation

- Centralizes key system information and encourages meetings to

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# – Cohesive Strategy – Five Year Development Perspective

## Congressional commentary in FY07 House Report:

**…the Great Lakes and Ohio River Division …Ohio River and Tributaries Navigation System Five-Year Development Perspective is …the most comprehensive and informative report that has come to the attention of the Committee. In it, the Corps attempts to assess the current status and ‘‘acceptable’’ level of performance for projects under its jurisdiction…. The Committee applauds the efforts of the Great Lakes and Ohio River Division and other interested parties in the**

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# Performance Standards Summarized in FYDP

## Intent: Performance Standards in FYDP

- To summarize results without details
- To convey sense of Navigation system reliability
- To summarize remedial action to achieve performance
- To give thumbnail sketch of conditions
- To establish performance expectations for entire system

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# -Reliability – System Maintenance Approach

- **Goal: Achieve Acceptable Levels of Reliability**
  - ✓ Establish Reliability Performance Standards definitions
  - ✓ Apply reliability standard to each project site
  - ✓ Assess current reliability status
  - ✓ Plan systems reliability strategy
  - ✓ Schedule best projects sequence for system reliability
  - **Discuss reliability plans with Navigation stakeholder**
  - **Execute the reliability improvement projects**

# Reliability Generic Performance Standards

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**A**

Virtually no compromise to authorized Federal project features accepted.

**B**

Minimal compromise to authorized Federal project features accepted.
There is a small probability that degraded conditions may result in inefficient operations i.e., slower and/or more costly navigation operations.

**C**

Moderate compromise to authorized Federal project features accepted.
There is a high probability that degraded conditions may result in inefficient operations, i.e., slower and/or more costly navigation operations.

**D**

Significant compromise to authorized Federal project features accepted. Closures of seven or more days are scheduled annually.

**F**

Extreme compromise to authorized Federal project features accepted. Closures of at least two weeks are scheduled annually.

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# Reliability Specific Performance Standards

## Navigation Locks & Dams

**A**

No major deficiencies with operating machinery, gates, or structure.

**B**

1 Gate non-operational with no impact on pool control. Operational machinery requires infrequent , minor maintenance. No structural problems.

**C**

2 Gates non-operational with no impact on pool control. Operational machinery requires regular, moderate maintenance and repair. No emergency bulkhead capability. Minor structural issues, e.g. minor downstream scour protection anchorages.

**D**

3 Gates non-operational with no impact on pool control. Operational machinery requires frequent maintenance and repair. No emergency bulkhead capability. Major structural issues and/or has potential to affect dam stability.

**F**

More than 3 gates non-operational and may impact pool control. Operational machinery unreliable. No emergency bulkhead capability. Imminent danger of structural failures or high probability of failure due to dam stability.

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# Reliability Specific Performance Standards

## Navigation Locks & Dams

| Level | A | B | C | D | F |
|---|---|---|---|---|---|
| Subjective Maintenance & Condition | Well maintained and have minimal deterioration. | Routinely maintained, and have minimal deterioration. | Minimally maintained as required and have moderate deterioration. | Only key items maintained, and have substantial deterioration. | No preventive maintenance, fix as fails, and have significant deterioration. |
| Unscheduled Closures: X days annually main chamber | 4 | 15 | 25 | 35 | 50 |
| Unscheduled Closures: X days annually auxiliary chamber | YES | ---- | ---- | ---- | NO |
| Navigation Dams: Condition to retain pool | See Criteria | See Criteria | See Criteria | See Criteria | See Criteria |

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# Reliability Specific Performance Standards

## River Channels Shallow Draft

| Level | A | B | C | D | F |
|---|---|---|---|---|---|
| Subjective Maintenance & Condition | Optimum availability of channels | Limited availability of channels | Moderate availability of channels | Reduced availability of channels | Minimal availability of channels |
| Percent Availability of Authorized Project width dimensions in 9’ system | 100% | 90% | 80%<br>1-way traffic | 70%<br>1-way traffic light loading | 50%<br>Traffic ceases |

# Example Specific "A" Deep Draft Performance Standards

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A

Virtually no compromise to authorized Federal project features

**Federal Navigation Channels:**
- Recommended availability of navigation channels.
- No greater than 10 percent loss of channel cross-section or reach area during the navigation season.
- No greater than 6 inches of shoaling in primary channel traffic areas during the navigation season.

**Federal Navigation Structures:**
- Navigation structures are well maintained and have minimal deterioration.
- Critical structures have 0-10 percent loss of as-built cross-section.
- Protected Federal channel areas have no greater than 6 inches of degradation (increase) in average wave height.
- Total length of navigation structures' cross-sectional losses is no greater than 15 percent of the total as-built navigation structures' length.

**Federal Confined Disposal Facilities:**
- Confined disposal facilities are well maintained, and have minimal deterioration.
- Confined disposal facility has at least 15 years of remaining capacity.

**Project Condition Surveys:**
- Project feature condition inspections are completed annually for all commercial harbor project elements.
- Wave gauge data gathering is current and continuous for the purpose of monitoring navigation conditions within the harbor-protected areas of the Federal Channel.
- Bathymetric data is available for all Federal Channel areas, and accurately reflects current conditions. Sounding data utilized for condition analysis must not be older than five months old.

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# Example Performance Levels Displayed in FYDP

| Official Authorization Name | Sub-Project Name | Acceptable Level of Performance | Current Level of Performance | #Levels Below Acceptable Performance |
|---|---|---|---|---|
| ALLEGHENY RIVER, PA | CW Bill Young Lock & Dam | B | D | 2 |
| ALLEGHENY RIVER, PA | Lock and Dam 2 | B | D | 2 |
| ALLEGHENY RIVER, PA | Lock and Dam 4 | C | C | 0 |
| ALLEGHENY RIVER, PA | Lock and Dam 5 | C | C | 0 |
| ALLEGHENY RIVER, PA | Lock and Dam 6 | C | D | 1 |
| ALLEGHENY RIVER, PA | Lock and Dam 7 | C | D | 1 |
| ALLEGHENY RIVER, PA | Lock and Dam 8 | C | D | 1 |
| ALLEGHENY RIVER, PA | Lock and Dam 9 | F | F | 0 |
| BARKLEY DAM AND LAKE BARKLEY, KY & TN | Barkley Lock | A | C | 2 |
| BIG SANDY HARBOR, KY | | A | B | 1 |
| CHANNEL MAINT, CUMBERLAND RIVER MILES 101-105, 205 | | B | C | 1 |
| CHANNEL MAINT, CUMBERLAND RIVER MILES 24-26, 145-148 | | A | B | 1 |
| CHANNEL MAINT, CUMBERLAND RIVER MILES 305-309, 371 | | D | D | 0 |
| CHEATHAM LOCK AND DAM, TN | Cheatham Lock | B | C | 1 |
| CORDELL HULL DAM AND RESERVOIR, TN | Cordell Hull Lock | D | D | 0 |
| ELK RIVER HARBOR, WV | | A | C | 2 |
| GREEN AND BARREN RIVERS, KY | L/D 1 | B | B | 0 |
| GREEN AND BARREN RIVERS, KY | L/D 2 | B | B | 0 |

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# Acceptable and Current Performance Reliability

## Ohio River & Tributaries Navigation System

| | Current Level of Performance Reliability | | | | | |
|---|---|---|---|---|---|---|
| Acceptable Level of Performance Reliability | A | B | C | D | F | #Projects Currently Below Acceptable |
| A | 3 | 14 | 14 | 4 | 5 | 37 |
| B | | 5 | 7 | 3 | 0 | 10 |
| C | | | 6 | 3 | 0 | 3 |
| D | | | | 3 | 0 | 0 |
| F | | | | | 1 | 0 |
| Totals | | | | | | 50 |

**74% of the Navigation system is currently below the Acceptable Level of Performance Reliability**

**Assessments effective 11/2005**

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# Acceptable and Current Performance Reliability

## Great Lakes Navigation System

| | Current Level of Performance Reliability | | | | | |
|---|---|---|---|---|---|---|
| Acceptable Level of Performance Reliability | A | B | C | D | F | #Projects Currently Below Acceptable |
| A | 1 | 4 | 3 | 0 | 0 | 7 |
| B | | 2 | 5 | 2 | 0 | 7 |
| C | | | 9 | 6 | 0 | 6 |
| D | | | | 9 | 2 | 2 |
| F | | | | | 0 | 0 |
| Totals | | | | | | 22 |

**33% of the Navigation system is currently below the Acceptable Level of Performance Reliability**

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# Expectations for Performance Standards

- **Generic & Specific Performance Standards**
  - Common definitions of performance levels
  - Basis of common understanding for what's expected
  - Generic standards applicable across the board
  - Specific standards applicable to specific features

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# How Did We Get Here?

- **Setting Performance Standards**
  - Holding stakeholder meetings to discuss conditions
  - Conceiving generic performance definitions
  - Creating specific feature performance definitions
  - Preparing tabular display of performance standards

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# How Did We Get Here?

- **Condition Assessments & Remedial Actions**
  - Summarized known conditions at all project sites
  - Determined actions needed to achieve performance
  - Prepared maintenance descriptions for each site

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# Remedial Maintenance to Achieve Performance

## Ohio River & Tributaries

- Miter gates at several locks
- Navigation dams erosion repair
- Locks operating systems
- Locks wall armor
- Submerged emergency gates repair
- Dam emergency bulkheads repair
- Tainter gates and hoist machinery
- Deteriorated concrete repair
- Channel maintenance dredging

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# Remedial Maintenance to Achieve Performance

## Great Lakes

- Channel depths & widths maintenance dredging
- Breakwater repairs / replacement
- Lock repairs
- Confined disposal facilities capacities & conditions

# Key Emphasis

- **Uniformity in performance levels definitions**
- **Uniformity in condition assessments**
- **Setting performance levels with stakeholders**
- **Summarizing performance levels**
- **Summarizing remedial maintenance**
- **Presenting summaries in FYDP**

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